The project plan

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CEES

Myself (room 3419)

Specialized in fish biology (Bio4371)

Ecology and evolution (Bio2120)

Population ecology

Population and quantitative genetics

Life history theory (Bio4140)

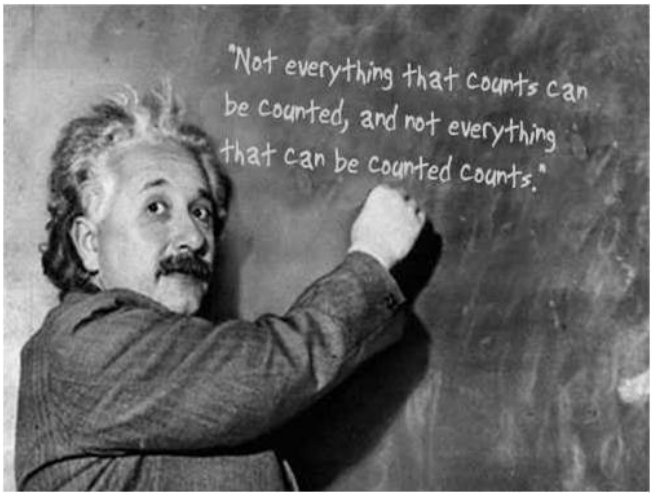
The "fish ecology and evolution group"

- PhD Annette Taugbøl (stickleback genetics)
- PhD Ruben Pettersen (parasites on fish)
- PhD Tonje Sørdalen (lobster – conservation biology)
- PhD Srinidhi Varadharjan (fish genomics)
- PhD Chloé Nater (population dynamics)
- PhD NN (biology of mesopelagic fishes)

- MS Joakim Sandkjenn (evolutionary effects of harvesting)

- Post doc Beatriz Dias Pauli (evolutionary effects of harvesting)
- Post doc Charlotte Evangelista (evolutionary effects of harvesting)

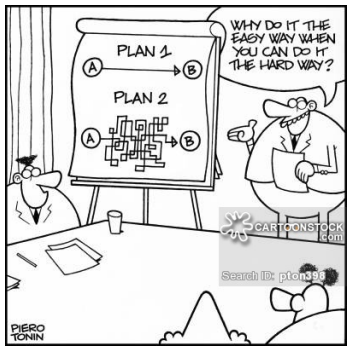
A project plan?



Contents of a plan

- General introduction (why and what)
- Material and methods (how and when)
- Predicted outcome
- Literature

- A short version of the first parts of your thesis!



Who do you write for?

- Yourself?
- Your supervisor?
- Your collaborators?
- Funding institutions?

- Student administration / program committee

The "WHY" part

- General background
  - **Theory!**
  - Earlier results - what do we know?
  - Remaining questions to be asked
  - Interesting because?
  - **Aims/goals**

Read!

Question: What to read?

WHAT?

- What are you studying?
  - Some general background on the study organism/organ/molecule/process ....
- Questions to be asked?
- Hypotheses and predictions to be tested?

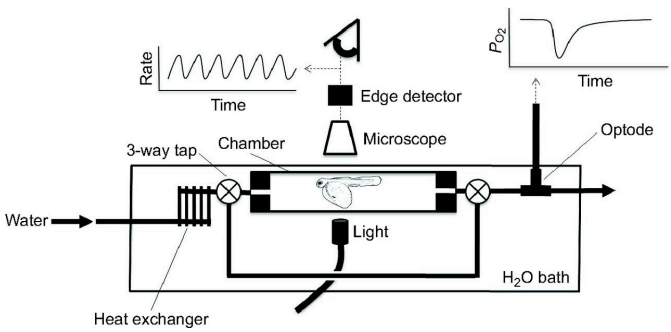
"I ask the following questions: ..."
"I will test the hypothesis that ..."
"I will test the prediction that ... based on the hypothesis ..."
"I will test the assumption ..."

Material and methods

- Collections/sampling
  - Sampling strategy
    - How to sample
    - Where to sample
    - When to sample
    - What to sample
  - Representative!
  - Sampling error?
  - Numbers!
- Link to your questions

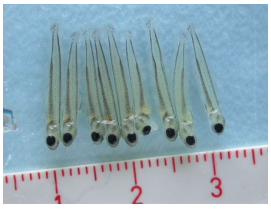
Experiments

- Material and methods
  - The experiment
    - Experimental design
    - Experimental protocol
    - Replication and control
  - Sample sizes



How to analyze?

- Methods
  - Equipment (type, do we have it?)
  - What to measure?
  - Precision
  - Replication
  - **Measurement error?**



Statistical treatment

- When you decide on the sampling design you are making statistical judgments and decisions.
- An experimental design is a statistical design: **think statistics**.
- **Power**!
- **What is the statistical unit?**

Ethical considerations

Sampling permits
Use of live animals/organisms
Human experiments

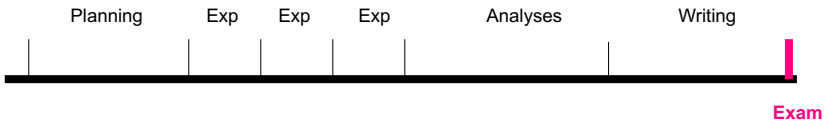
General laws and regulations

General ethics

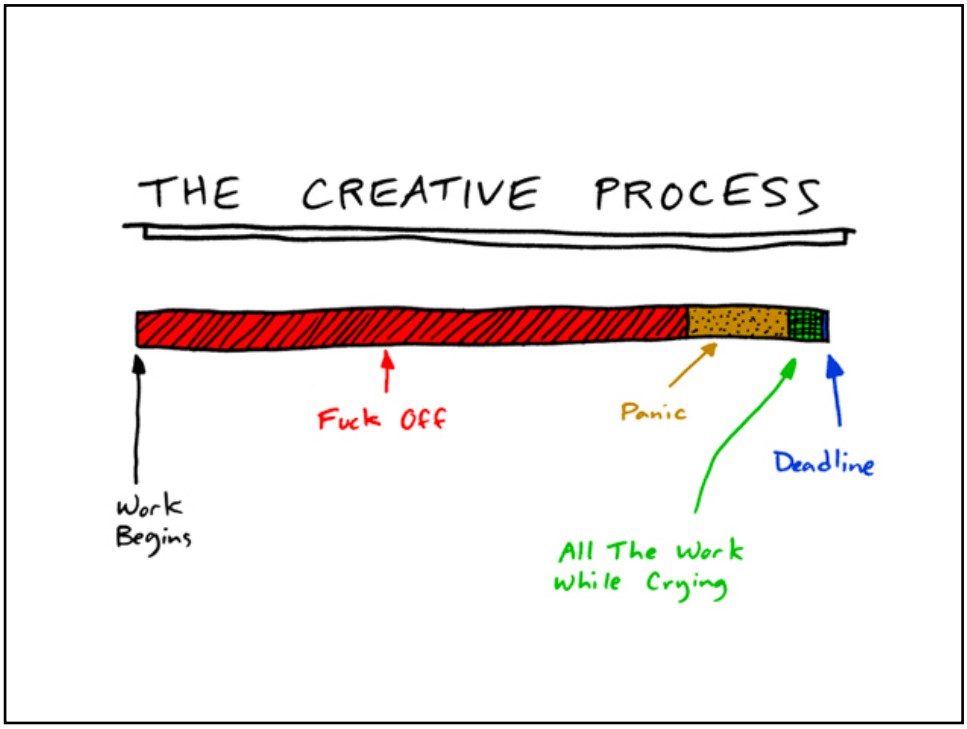
Power: not too many - not too few!
Sample sizes can be decided using formal power analyses - or common sense - or help from experienced researchers.

When?

- **Timeline is very important**
  - 1 week experiment - 1 month analysis?
  - Can it be done (time and money)?



Never underestimate the time needed to analyze and write



Contents of the project description

- Introduction
  - Aims and goals
- Material and methods
- Timeline (when to do what)
- References